White Paper outline

Overview

Includes time evolution of a collision

Relationship to other areas of physics, broader impact/International dimensions of RHIC

Summary of the first 5 years

Emphasising discoveries to date

Fundamental questions for the next ten years

Explore the phase diagram in a fundamental theory
Explore out of equilibrium processes in a fundamental theory
Wave function of the proton
Wave function of the nucleus
Uniqueness of the RHIC facility

Future Physics program at RHIC:

Introduction

Discussion of the facility

Detector and collider evolution, highlight need for luminosity upgrade

Thermalization

Open heavy flavor R_{AA} and v_2	(thermalization)
(p_T, ϕ, RP, flavor dependence)	
Gamma-jet correlations (vs RP)	(thermalization)
Direct thermal photons	(chemical equilibration)

EOS and QCD phase diagram

Energy density, temperature

Open heavy flavor R_{AA} and v_2	(energy loss)
Gamma-jet correlations (vs RP)	(energy loss)
Charm tagged jets (inc. J/ψ)	(energy loss)
Quark jets at high p_T at RHIC	
Three particle correlations	(energy loss, speed of sound)
Direct real and virtual gammas	(temperature, gamma HBT)
Intermediate mass dileptons	(temperature, quasi-particles)

Viscosity

Asymmetric systems	
y dependence with PID	(viscosity, critical point)

Deconfinement

Charmonium spectra	
J/ψ R_{AA} vs p_T and y, $\langle p_T^2 \rangle$ and v_2	(evidence of coalescence)
J/ψ, ψ' and χ_c	(deconfinement, temperature)
Y, Y',Y''	(deconfinement, temperature)

Chiral symmetry restoration

Low mass dielectron spectra	(VM in-medium decay)

Hadronization

R_{AA}, v_2, baryon/meson ratios (PID,p_T) (recombination vs fragmentation)

Identified particle correlations
at intermediate-high p_T (recombination vs fragmentation)

Exploratory studies

Charge asymmetry wrt RP (CP violation)

Gluon saturation

R_{dA}, correlations, monojets, direct gamma (gluon saturation onset, coherence)

Structure of the nucleon

Precision measurements of proton
spin structure (proton spin origin)

Transverse spin phenomena in QCD (eliminates gluon spin contributions)

Summary